CLAIMS

1. Process for *in vitro* detection of resistance of cancer cells to oxaliplatin treatment, characterized in that it involves the measurement of the mitochondrial apoptosis of cancer cells that are treated or can or are to be treated with oxaliplatin.

2. Process according to claim 1, characterized in that the cancer is a cancer treated with oxaliplatin, in particular a colorectal cancer, a cancer of the ovaries, a cancer of the germinal cells, a cancer of the lung, a cancer of the digestive tract, a cancer of the prostate, a cancer of the pancreas, a cancer of the small intestine or a cancer of the stomach.

3. Process according to claim 1 or 2, characterized in that it involves the measurement of the expression of at least one mitochondrial apoptosis gene.

4. Process according to any of claims 1 to 3, characterized in that it involves the measurement of the expression of at least one gene coding for a Bax, Bcl-2 or cytochrome c protein.

5. Process according to claim 3 or 4, characterized in that it involves the measurement of mRNA transcripts of the mitochondrial apoptosis genes.

6. Process according to claim 3 or 4, characterized in that it involves measurement of the amount and/or activity of mitochondrial apoptosis proteins in the cancer cells.

7. Process for *in vitro* detection of the resistance of cancer cells to oxaliplatin treatment characterized in that it involves the detection of at least one mutation indicative of deficient mitochondrial apoptosis in the

case of treatment with oxaliplatin, in particular of a mutation in a region of the Bax gene containing a series of 8 deoxyguanines.

8. Process according to any of claims 1 to 6, characterized in that it involves:

a) determination of the level of mitochondrial apoptosis, and/or the level of expression of at least one mitochondrial apoptosis gene, in cancer cells sampled from a patient;

b) comparison to the level measured with a control sample of cells not resistant to oxaliplatin.

9. Process according to claim 6, characterized in that it involves putting cancer cells together with an antibody capable of recognizing a mitochondrial apoptosis protein or a biologically active fragment, and the visualization of the antigen-antibody complex possibly formed.

10. Process according to any of claims 1 to 5, characterized in that it implements a primer or probe sequence specific for the mitochondrial apoptosis gene.

11. Process according to claim 10, characterized in that it involves:

a) possible isolation of mitochondrial DNA from the biological sample to be examined, or the obtaining of a cDNA from the RNA of the biological sample or from genomic DNA;

b) specific amplification of the DNA from a) by means of at least one primer for amplification of the mitochondrial apoptosis gene.

12. Process according to claim 10, characterized in that it involves:

a) putting a nucleotide probe of an apoptosis gene together with the biological sample analyzed, the nucleic acid of the sample having, if need be, been previously made accessible to hybridization, under conditions allowing hybridization of the probe and the nucleic acid of the sample;

b) visualization of the hybrid possibly formed.

13. Process for selection of compounds that inhibit the resistance of cancer cells to oxaliplatin, characterized in that it involves:

a) addition of at least one candidate compound to the cancer cells resistant to oxaliplatin;

b) comparison of the level of mitochondrial apoptosis and/or expression of at least one apoptosis gene in the presence and absence of the compound;

c) deduction of the anti-resistance effect when the level of mitochondrial apoptosis is greater after addition of the compound, or when the level of expression is greater when the gene is a gene that stimulates mitochondrial apoptosis, or when the level of expression is less when the gene is a gene that inhibits mitochondrial apoptosis.

14. Use of at least one agent stimulating mitochondrial apoptosis, in particular chosen from among TNF, FasL, glutamate, Herbimycin A, Paraquat, inhibitors of protein kinase such as Staurosporine, Calphostin C, derivatives of d-erythro-sphingosine, Chelerythrine chloride, inducers of MAP kinase such as Anisomycin and inducers of MPT for the preparation of a medication for patients presenting or capable of presenting oxaliplatin resistance.

15. Use according to claim 14 for the preparation of a medication against colorectal cancer, or cancer of the ovaries, the germinal cells, the lung, the digestive tract, the prostate, the pancreas, the small intestine or the stomach.

16. Use according to claim 14 for the preparation of a medication against colorectal cancers.

17. Product containing oxaliplatin and an agent stimulating mitochondrial apoptosis, in particular chosen from among TNF, FasL, glutamate, Herbimycin A, Paraquat, inhibitors of protein kinase such as Staurosporine, Calphostin C, derivatives of d-erythro-sphingosine, Chelerythrine chloride, inducers of MAP kinase such as Anisomycin and inducers of MPT as a combination product for simultaneous use, separated or spaced apart in time as an anti-cancer agent.

18. Composition consisting of oxaliplatin and at least one anti-resistance agent capable of stimulating mitochondrial apoptosis, chosen from among TNF, FasL, glutamate, Herbimycin A, Paraquat, inhibitors of protein kinase such as Staurosporine, Calphostin C, derivatives of d-erythro-sphingosine, Chelerythrine chloride, inducers of MAP kinase such as Anisomycin and inducers of MPT.

19. Kit for diagnosis of resistance of a cancer to oxaliplatin characterized in that it includes:

a) at least one compartment suitable to contain a probe;

b) possibly the reagents necessary for the implementation of a hybridization reaction;

c) possibly at least one primer and the reagents necessary for a DNA amplification reaction.

20. Cell HCT116/S as registered on 16 June 2003, under number: I-3051, with the *Collection Nationale de Cultures de Microorganismes (CNCM)*, Pasteur Institute, Paris, France.

21. Use of cell HCT116/S according to claim 20, or of any cell derived from this cell HCT116/S, to study the correlation between the resistance of cancer cells, most preferably colorectal, to anti-cancer treatment and the expression of a mitochondrial apoptosis gene.

22. Use of cell HCT116/S according to claim 20, or of any cell derived from this cell HCT116/S, for the visualization and identification of a mitochondrial apoptosis gene whose expression is linked to the resistance of cancer cells, most preferably colorectal, to anti-cancer treatment.

23. Use of cell HCT116/S according to claim 20, or of any cell derived from this cell HCT116/S, for the selection of a compound capable of stimulating mitochondrial apoptosis in a cancer cell, said compound being designed to be combined with an anti-cancer agent to which said cancer cell is resistant, most preferably said anti-cancer agent to which said cancer cell is resistant being oxaliplatin and, as the case may be, said cell is a colorectal cancer cell.